

**WHAT IS CLAIMED IS:**

1. A facilitated transport membrane for separation of alkene hydrocarbons from hydrocarbon mixtures, comprising a porous support and a solid polymer electrolyte consisting of a transition metal salt and a polymer having phthalic structure.
2. The facilitated transport membrane according to Claim 1, wherein a cation of the transition metal salt has the electronegativity of 1.6~2.3.
3. The facilitated transport membrane according to Claim 2, wherein the transition metal is one selected from the group consisting of Mn, Fe, Co, Ni, Cu, Mo, Tc, Ru, Rh, Pd, Ag, Re, Os, Ir, Pt and complexes thereof.
4. The facilitated transport membrane according to Claim 1, wherein the transition metal salt has a lattice energy of 2500 kJ/mol or less.
5. The facilitated transport membrane according to Claim 4, wherein an anion of the transition metal salt is one selected from the group consisting of F<sup>-</sup>, Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, CN<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, SCN<sup>-</sup>, ClO<sub>4</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, BF<sub>4</sub><sup>-</sup>, AsF<sub>6</sub><sup>-</sup>, PF<sub>6</sub><sup>-</sup>, SbF<sub>6</sub><sup>-</sup>, AlCl<sub>4</sub><sup>-</sup>, N(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub><sup>-</sup> and C(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub><sup>-</sup>.
6. The facilitated transport membrane according to Claim 1, wherein the transition metal salt includes a complex salt of transition metal or a mixture of transition metal salts.

7. The facilitated transport membrane according to Claim 1, wherein the polymer is one selected from the group consisting of poly(ethylene phthalate), poly(diallyl phthalate), poly(ethylene phthalate-co-1,4-phenylene phthalate) and physical mixtures thereof.
8. The facilitated transport membrane according to Claim 1, wherein the porous support is a porous polymer membrane or ceramic membrane used in the preparation of a conventional composite membrane.
9. The facilitated transport membrane according to Claim 1, wherein the hydrocarbon mixtures to be separated contain at least one alkene hydrocarbon and at least one alkane hydrocarbon and/or other gas.
10. The facilitated transport membrane according to Claim 9, wherein the alkene hydrocarbon is one selected from the group consisting of ethylene, propylene, butylene, 1,3-butadiene, isobutylene and mixtures thereof; the alkane hydrocarbon is one selected from the group consisting of methane, ethane, propane, butane, isobutane and mixtures thereof; and the other gas is one selected from the group consisting of oxygen, nitrogen, carbon dioxide, carbon monoxide, water and mixtures thereof.